

Listing of Claims:

Claims 1-13 (Canceled)

Claim 14. (New) A level measuring device operating with microwave bursts, for producing a level value representative of a level in a vessel, said level measuring device comprising:

 a transceiver unit for generating a level-dependent intermediate-frequency signal by means of a transmit signal and a receive signal;

 a transducer element which in operation couples transmitted waves, particularly pulsed waves, into the vessel under control of the transmit signal and which converts echo waves reflected from the contents of the vessel into the receive signal; and

 a control unit with a volatile data memory for storing, at least temporarily, a finite sampling sequence currently representing the intermediate-frequency signal.

Claim 15. (New) The level measuring device as set forth in claim 14, which determines the level value by means of amplitude information derived from the sampling sequence.

Claim 16. (New) The level measuring device as set forth in claim 14, which determines the level value by means of phase information derived from the sampling sequence.

Claim 17. (New) The level measuring device as set forth in claim 14, wherein the volatile data memory holds, at least temporarily, a first signal sequence, which

represents a numerically performed multiplication of the sampling sequence by a digital sine-wave signal sequence.

Claim 18. (New) The level measuring device as set forth in claim 17, wherein the volatile data memory holds, at least temporarily, a first quadrature-signal sequence, which represents a numerically performed downconversion of at least a portion of the first signal sequence.

Claim 19. (New) The level measuring device as set forth in claim 18, wherein the volatile data memory holds, at least temporarily, a first average - value sequence, which serves in particular to generate the first quadrature - signal sequence.

Claim 20. (New) The level measuring device as set forth in claim 14, wherein the volatile data memory holds, at least temporarily, a digital phase sequence which corresponds to a temporal phase variation of at least a portion of the intermediate - frequency signal.

Claim 21. (New) The level measuring device as set forth in claim 14, wherein the volatile data memory holds, at least temporarily, a digital envelope which represents a temporal amplitude variation of the intermediate - frequency signal.

Claim 22. (New) A level measuring device operating with microwaves, particularly with microwave bursts, for producing a level value representative of a level in a vessel, said level measuring device comprising:

a transceiver unit for generating a level-dependent intermediate-frequency signal by means of a transmit signal and a receive signal;

a transducer element which in operation couples waves, particularly

pulsed waves, into the vessel under control of the transmit signal and which converts echo waves reflected from the contents of the vessel into the receive signal; and a control unit with a volatile data memory for storing, at least temporarily, a digital phase sequence which represents a normalization of the intermediate-frequency signal to an amplitude variation of the intermediate-frequency signal and which corresponds to a temporal phase variation of the intermediate frequency signal.

Claim 23. (New) The level measuring device as set forth in claim 22, which comprises a logarithmic amplifier for the intermediate-frequency signal.

Claim 24. (New) The level measuring device as set forth in claim 17, wherein the volatile data memory holds, at least temporarily, a second signal sequence, which represents a numerically performed multiplication of the sampling sequence by a digital cosine-wave signal sequence.

Claim 25. (New) The level measuring device as set forth in claim 18, wherein the volatile data memory holds, at least temporarily, a second quadrature - signal sequence, which represents a numerically performed downconversion of at least a portion of the second signal sequence.

Claim 26. (New) The level measuring device as set forth in claim 24, wherein the volatile data memory holds, at least temporarily, a second quadrature - signal sequence, which represents a numerically performed downconversion of at least a portion of the second signal sequence.

Claim 27. (New) The level measuring device as set forth in claim 19, wherein the volatile data memory holds, at least temporarily, a second average-value sequence,

which serves in particular to generate the second quadrature-signal sequence and represents a variation of a time average of at least a portion of the second signal sequence.

Claim 28. (New) The level measuring device as claimed in claim 14, wherein the transducer element couples pulsed waves into the vessel.

Claim 29. (New) the level measuring device as claimed in claim 14, wherein the transmit signal is a burst sequence having a center frequency lying in a range between 0.5 GHz and 30 GHz.

Claim 30. (New) The level measuring device as claimed in claim 14, wherein the transmit signal is a burst sequence having a center frequency lying above 30 Ghz.

Claim 31. (New) The level measuring device as claimed in claim 14, wherein the transmit signal is a burst sequence having a repetition rate being set at a range between 1 MHz and 10 MHz.

Claim 32. (New) The level measuring device as claimed in claim 14, wherein the transmit signal is a burst sequence having a repetition rate lying above 10 MHz.

Claim 33. (New) The level measuring device as set forth in claim 14, which comprises a logarithmic amplifier for the intermediate-frequency signal.

Claim 34. (New) A level measuring device operating with microwaves for producing a level value representative of a level in a vessel, said level measuring device comprising:

 a transceiver unit for generating a level-dependent intermediate-frequency signal by means of a transmit signal and a receive signal;

a transducer element coupling pulsed microwaves into the vessel under control of the transmit signal, and converting echo waves reflected from the contents of the vessel into the receive signal; and

a control unit with a volatile data memory for storing, at least temporarily, a finite sampling sequence currently representing the intermediate-frequency signal.

Claim 35. (New) The level measuring device as set forth in claim 34, which determines the level value by means of amplitude information derived from the sampling sequence.

Claim 36. (New) The level measuring device as set forth in claim 34, which determines the level value by means of phase information derived from the sampling sequence.

Claim 37. (New) The level measuring device as set forth in claim 34, wherein the volatile data memory holds, at least temporarily, a first signal sequence representing a numerically performed multiplication of the sampling sequence by a digital sine-wave signal sequence.

Claim 38. (New) The level measuring device as set forth in claim 37, wherein the volatile data memory holds at least temporarily, a second signal sequence representing a numerically performed multiplication of the sampling sequence by a digital cosine-wave signal sequence.

Claim 39. (New) The level measuring device as set forth in claim 37, wherein the volatile data memory holds, at least temporarily, a first quadrature-signal sequence,

which represents a numerically performed downconversion of at least a portion of the first signal sequence.

Claim 40. (New) The level measuring device as set forth in claim 38, wherein the volatile data memory holds, at least temporarily a second quadrature-signal sequence, which represents a numerically performed downconversion of at least a portion of the second signal sequence.

Claim 41. (New) The level measuring device as set forth in claim 39, wherein the volatile data memory holds, at least temporarily, a data record which corresponds to a phase of a data record of the sampling sequence and represents a numerical division of a data record of the first quadrature-signal sequence by an essentially equal-locus data record of the second quadrature-signal sequence.

Claim 42. (New) The level measuring device as set forth in claim 40, wherein the volatile data memory holds, at least temporarily, a data record which corresponds to a phase of a data record of the sampling sequence and represents a numerical division of a data record of the first quadrature - signal sequence by an essentially equal - locus data record of the second quadrature - signal sequence.

Claim 43. (New) The level measuring device as set forth in claim 39 wherein the volatile data memory holds, at least temporarily, a second average-value sequence, which serves in particular to generate the second quadrature-signal sequence and which represents a variation of a time average of at least a portion of the second signal sequence.

Claim 44. (New) The level measuring device as set forth in claim 40, wherein the

volatile data memory holds, at least temporarily, a second average - value sequence, which serves in particular to generate the second quadrature - signal sequence and which represents a variation of a time average of at least a portion of the second signal sequence.

Claim 45. (New) The level measuring device as set forth in claim 34, wherein the volatile data memory holds, at least temporarily, a first digital phase sequence which corresponds to a temporal phase variation of at least a portion of the intermediate-frequency signal.

Claim 46. (New) The level measuring device as set forth in claim 45, wherein the volatile data memory holds, at least temporarily, a second digital phase sequence which corresponds to a temporal phase variation of at least a portion of the intermediate frequency signal.

Claim 47. (New) The level measuring device as set forth in claim 34, wherein the volatile data memory holds, at least temporarily, a digital envelope representing a temporal amplitude variation of the intermediate-frequency signal.

Claim 48. (New) The level measuring device as claimed in claim 34 wherein the transducer element couples pulsed waves into the vessel.

Claim 49. (New) The level measuring device as claimed in claim, 34 wherein the transmit signal is a burst sequence having a center frequency and a repetition rate.

Claim 50. (New) The level measuring device as set forth in claim 34, which comprises a logarithmic amplifier for the intermediate-frequency signal.

Claim 51. (New) The level measuring device as claimed in claim 34, wherein

the transmit signal is a burst sequence having a center frequency lying in a range between 0.5 GHz and 30 GHz.

Claim 52. (New) The level measuring device as claimed in claim 34 wherein the transmit signal is a burst sequence having a center frequency lying above 30 GHz.

Claim 53. (New) The level measuring device as claimed in claim 34 , wherein the transmit signal is a burst sequence having a repetition rate being set at a range between 1 MHz and 10 MHz.

Claim 54. (New) The level measuring device as set forth in claim 34, wherein the transmit signal is a burst sequence having a repetition rate lying above 10 MHz.

Claim 55. (New) The level measuring device as set forth in claim 34, which comprises a logarithmic amplifier for the intermediate - frequency signal.

Claim 56. (New) A level measuring device operating with microwaves for producing a level value representative of a level in a vessel, said level measuring device comprising:

 a transceiver unit for generating a level-dependent intermediate-frequency signal by means of a transmit signal and a receive signal, said transmit signal is a sequence of coherent bursts having a predetermined center frequency and a predetermined repetition rate, said intermediate-frequency signal having a center frequency corresponding with said center frequency of said transit signal;

 a transducer element coupling pulsed microwaves into the vessel under control of the transmit signal, and converting echo waves reflected from the contents of the vessel into the receive signal; and

a control unit with an analog-to-digital converter and with a digital level computer, said analog-to-digital converter being coupled to an output of the transceiver unit providing said intermediate-frequency signal, and said analog-to-digital converter providing said digital level computer with a digital intermediate-frequency signal ,

wherein the digital level computer derives said level value by using said digital intermediate frequency signal.

Claim 57. (New) The level measuring device as claimed in claim 56, wherein the control unit comprises a volatile data memory for storage, at least temporarily, a finite sampling sequence currently representing the intermediate - frequency signal.

Claim 58. (New) The level measuring device as set forth in claim 56, which comprises a logarithmic amplifier for the intermediate-frequency signal generated by the transceiver unit, said logarithmic amplifier being coupled to said analog-to-digital converter.

Claim 59. (New) The level measuring device as set forth in claim 25, wherein the volatile data memory holds, at least temporarily, a second average-value sequence, which serves in particular to generate the second quadrature-signal sequence and represents a variation of a time average of at least a portion of the second signal sequence.

Claim 60. (New) The level measuring device as set forth in claim 25, wherein the volatile data memory holds, at least temporarily, a data record which corresponds to a phase of a data record of the sampling sequence and represents a numerical division

of a data record of the first quadrature-signal sequence by an essentially equal-locus data record of the second quadrature-signal sequence.

Claim 61. (New) The level measuring device as set forth in claim 14, further comprising:

 a communications unit for sending measuring data to a remote area.

Claim 62. (New) The level measuring device as set forth in claim 14, wherein:
 said transceiver unit includes a mixer circuit which outputs an intermediate - frequency signal for delivery to said control unit.